Crystallization of a-Si:H Thin Film by Laser Annealing

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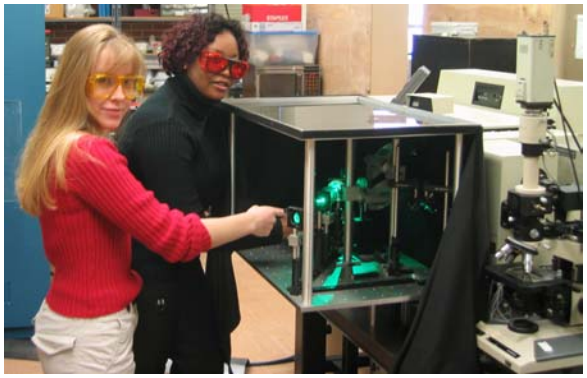
Nanocrystalline semiconductors are being considered for large area electronics to replace current amorphous Si based materials. In a collaborative project with North Carolina Central University, students employed laser processing to form nanocrystalline semiconductor films. Thin a-Si:H films with different hydrogen concentration, were crystallized by 514.5 nm laser radiation and simultaneously monitored by Raman spectroscopy. The analysis showed an apparent crystallization activation energy of ~0.5 eV with a mean crystal size that varied between 3 and 6 nm - decreasing with increasing irradiation energy and initial hydrogen content.



Students Jennifer J. Huening (front) from North Carolina State University and Doryne Sunda-Meya (back) from North Carolina Central University are setting up the experiment (top) and analyzing the results (below).